

NPAFC
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United States National Cruise Plan for BASIS Research, August - October, 2004

Ocean Carrying Capacity Program
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by the

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Introduction

Pacific salmon returns to rivers draining to the eastern Bering Sea have been inconsistent and at times very weak. Low returns of chinook and chum salmon to the Yukon River, Kuskokwim River, and Norton Sound area of Alaska prompted the State of Alaska during 2000 to restrict commercial and subsistence fisheries and declare the region a fisheries disaster area. Weak salmon returns to these river systems follow several years of low sockeye salmon returns to Bristol Bay, which was declared a fisheries disaster region during 1998 by the State of Alaska and the U.S. Department of Commerce. Causes of the poor salmon returns to these river systems are not understood; however, the regional scale decline of these stocks indicates that the marine environment may play a critical role. Ocean conditions, particularly in the first few months after leaving freshwater, are known to significantly affect salmon survival (Holtby et al. 1990; Friedland et al. 1996; Beamish and Mahnken 2001). Mechanisms affecting marine survival of the eastern Bering Sea salmon stocks are unknown principally due to the lack of information on salmon during their marine life-history stage. In an effort to improve our understanding of the marine life-history stage of salmon in the Bering Sea, the North Pacific Anadromous Fish Commission (NPAFC) initiated a proposal for an internationally coordinated research program on salmon in the Bering Sea called the Bering-Aleutian Salmon International Survey (BASIS) (NPAFC, 2001). As part of BASIS, scientists from the National Marine Fisheries Service (NMFS), Ocean Carrying Capacity (OCC) program will conduct a survey during Fall 2004 over the eastern Bering Sea shelf to provide key ecological data of the eastern Bering Sea salmon stocks during their juvenile life-history stage. The goal of OCC/BASIS salmon research cruises is to understand mechanisms underlying the effects of environment on the distribution, migration, and growth of juvenile salmon in the eastern Bering Sea. Primary objectives of the BASIS survey will be to: 1) determine the extent of offshore migrations of juvenile salmon from rivers draining into the eastern Bering Sea, 2) describe the physical environment of the eastern and northeastern Bering Sea shelf waters occupied by juvenile salmon, and 3) collect biological information on other ecologically important species.

Survey

The annual OCC/BASIS survey will be conducted at stations located over the eastern Bering Sea shelf (Figure 1). During fall 2004, the survey will begin in Dutch Harbor, Alaska about August 12 and end in Dutch Harbor about October 3 (Table 1). Participating scientists are listed in Table 2. Fish sampling north of 59°N will be along latitudinal parallels; transects and sampling stations within Bristol Bay will be along longitudinal meridians (Figure 1).

The cruise will be conducted aboard the chartered fishing vessel (F/V) *Sea Storm*. Fish samples will be collected using two midwater rope trawls, models 400/580 and 300, made by

Cantrawl Pacific Limited¹ of Richmond, B.C., Canada. Both nets are approximately 198 m long, have hexagonal mesh in wings and body, and a 1.2-cm mesh liner in the codend. The 400/580 has a typical spread of 50 m horizontally and 18 m vertically; whereas, the 300 has a typical spread of 55 m horizontally and 11 m vertically. At each station, the nets will be towed at or near the surface for 30 minutes at speeds between 3.5 and 5 kts.

Salmon and other fishes will be sorted by species and counted. We expect 12,000 juvenile salmon (pink (750), chum (5,000), sockeye (5,000), coho (750), and chinook (500)) will be caught during the survey. Standard biological measurements including fork length, body weight, and sex as well as scale samples from the preferred area (for growth analyses) will be taken from subsamples of all salmon species. All other fish species will be counted and standard biological measurements including length and weight will be taken from subsamples of each species. Diets of subsamples of salmon as well as other marine fish will be examined onboard.

Oceanographic data will be collected at each trawl station. Depth profiles of salinity and temperature will be taken from surface to near bottom depths at each trawl station using a conductivity, temperature, and depth meter. Continuous measurements of surface temperature and salinity will be collected using a SBE-45 thermosalinograph, made by Sea-Bird Electronics, Inc¹. of Bellevue, WA. Zooplankton samples will be collected at each trawl station using double oblique bongo tows taken to near bottom depths using a 60-cm diameter frame with 505 and 333 micron mesh nets.

References

- Beamish, R.J., and C. Mahnken. 2001. A critical size and period hypothesis to explain natural regulation of salmon abundance and the linkage to climate and climate change. *Progress in Oceanography* 49:423-437.
- Friedland, K.D., R.E. Haas, and T.F. Sheehan. 1996. Post-smolt growth, maturation, and survival of two stocks of Atlantic salmon. *Fishery Bulletin* 94:654-663.
- Holtby, L.B., B.C. Andersen, R.K. Kadowaki. 1990. Importance of smolt size and early ocean growth to interannual variability in marine survival of coho salmon (*Oncorhynchus kisutch*). *Canadian Journal of Fisheries and Aquatic Sciences* 47:2181-2194.
- North Pacific Anadromous Fish Commission 2001. Draft plan for NPAFC Bering-Aleutian Salmon International Survey (BASIS). NPAFC Doc. 579. 27 p.

¹ Reference to trade names does not imply endorsement by the National Marine Fisheries Service, NOAA.

Table 1. Cruise itinerary for the NMFS OCC August 12 – October 3, 2004 BASIS research cruise.

Date	Location/Activity
Leg 1	
11-August	Scientists arrive in Dutch Harbor, AK
12-August	Load scientists and gear
13-August	Test gear
14-August	Begin survey (Survey stations south of 60°N)
8-September	Enroute Nome, AK
9-September	Arrive Nome; unload Leg1 scientists and gear
10-September	Leg 1 scientists depart Nome, AK
Leg 2	
8-September	Scientists arrive Nome, AK
9-September	Load Leg 2 scientists and gear
10-September	Begin survey (Survey stations north of 60°N)
1-October	Enroute Dutch Harbor, AK
3-October	Arrive Dutch Harbor, AK, unload Leg 2 scientists and gear, end survey
4-October	Scientists depart Dutch Harbor, AK

Table 2. Participating Scientists during the August 12 – October 3, 2004 OCC juvenile salmon survey in the coastal waters of the eastern and northeastern Bering Sea.

Scientists		Affiliation
Leg 1 (Aug 11 – Sep 10)		
FPC	Ed Farley	NMFS/ABL
	Lisa Eisner	NMFS/ABL
	Angela Middleton	NMFS/ABL
	Oleg Ivanof	TINRO
	Natalia Kuznetsova	TINRO
	Scientist	TBD
Leg 2 (Sep 8 – Oct 4)		
FPC	Jim Murphy	NMFS/ABL
	John Pohl	NMFS/ABL
	Jamal Moss	NMFS/ABL
	Oleg Ivanof	TINRO
	Natalia Kuznetsova	TINRO
	Scientist	TBD
FPC	-	Field Party Chief
NMFS	-	National Marine Fisheries Service
ABL	-	Auke Bay Laboratory
TBD	-	To Be Determined

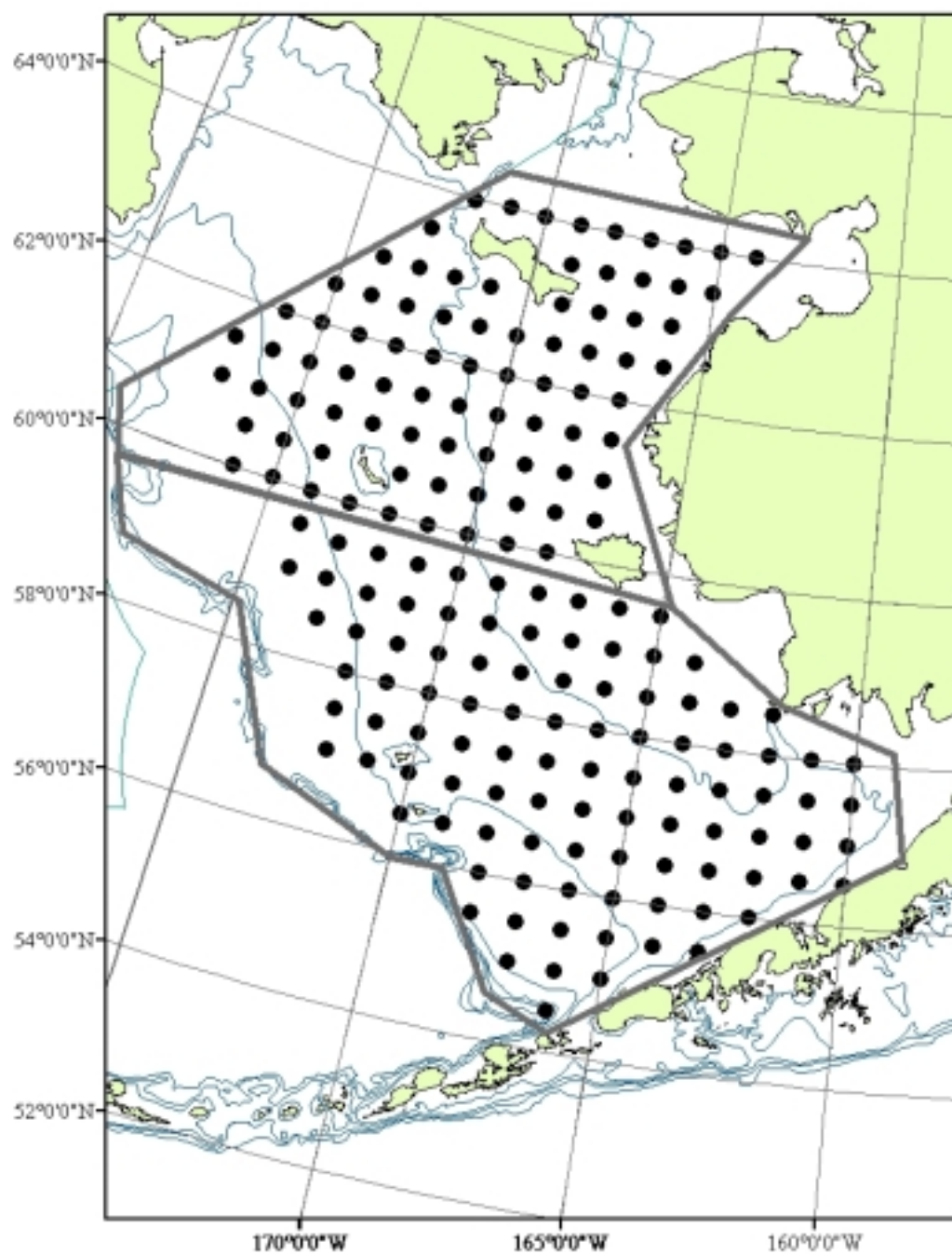


Figure 1. Proposed station locations to be sampled by NMFS OCC program as part of the BASIS 2004 survey, August 12 – October 3, 2004.

